

Amendments to the Claims

This listing of claims will replace all prior versions, and listing, of claims in the application.

Listing of Claims:

1. (CANCELED)

2. (PREVIOUSLY PRESENTED) A method for driving an image display device which includes a plurality of pixel electrodes which are formed on a substrate, pixel switching elements which are individually connected to the pixel electrodes, a plurality of signal lines for applying a data signal according to a display image to the pixel electrodes, and a common electrode for applying a common potential to pixels, said method controlling a voltage applied to the pixel electrodes in a conduction period of the pixel switching elements according to a pulse width supplied to the signal lines,

wherein the voltage applied to the pixel electrodes is less than a voltage supplied to the signal lines, and

wherein a proportion of a maximum value of the voltage applied to the pixel electrodes with respect to the voltage supplied to the signal lines becomes different depending on a polarity of the voltage applied to the pixel electrodes.

3. (PREVIOUSLY PRESENTED) A method for driving an image display device which includes a plurality of pixel electrodes which are formed on a substrate, pixel switching elements

which are individually connected to the pixel electrodes, a plurality of signal lines for applying a data signal according to a display image to the pixel electrodes, and a common electrode for applying a common potential to pixels, said method controlling a voltage applied to the pixel electrodes in a conduction period of the pixel switching elements according to a pulse width supplied to the signal lines,

wherein the voltage applied to the pixel electrodes is less than a voltage supplied to the signal lines, and

wherein the pulse width of a supplied voltage to the signal lines in the conduction period of the pixel switching elements becomes different depending on a polarity of the voltage applied to the pixel electrodes, even when displaying the same tone.

4. (PREVIOUSLY PRESENTED) A method for driving an image display device which includes a plurality of pixel electrodes which are formed on a substrate, pixel switching elements which are individually connected to the pixel electrodes, a plurality of signal lines for applying a data signal according to a display image to the pixel electrodes, and a common electrode for applying a common potential to pixels, said method controlling a voltage applied to the pixel electrodes in a conduction period of the pixel switching elements according to a pulse width supplied to the signal lines,

wherein the voltage applied to the pixel electrodes is less than a voltage supplied to the signal lines, and

wherein an allocated time for a single scanning line is different for each polarity of the voltage applied to the pixel electrodes.

5. (PREVIOUSLY PRESENTED) A method for driving an image display device which includes a plurality of pixel electrodes which are formed on a substrate, pixel switching elements which are individually connected to the pixel electrodes, a plurality of signal lines for applying a data signal according to a display image to the pixel electrodes, and a common electrode for applying a common potential to pixels, said method controlling a voltage applied to the pixel electrodes in a conduction period of the pixel switching elements according to a pulse width supplied to the signal lines,

wherein the voltage applied to the pixel electrodes is less than a voltage supplied to the signal lines, and

wherein, with respect to an image display device having the common electrode for applying a common potential to the pixels and having a plurality of scanning lines for driving the pixel switching elements, liquid crystal is displaced according to a potential difference between the common electrode and the pixel electrodes so as to carry out display, and an amplitude of a voltage supplied to the signal lines is equal to an amplitude of a voltage supplied to the common electrode.

6. (PREVIOUSLY PRESENTED) A method for driving an image display device which includes a plurality of pixel electrodes which are formed on a substrate, pixel switching elements

which are individually connected to the pixel electrodes, a plurality of signal lines for applying a data signal according to a display image to the pixel electrodes, and a common electrode for applying a common potential to pixels, said method controlling a voltage applied to the pixel electrodes in a conduction period of the pixel switching elements according to a pulse width supplied to the signal lines,

wherein the voltage applied to the pixel electrodes is less than a voltage supplied to the signal lines, and

wherein a maximum value of an amplitude of the voltage applied to the pixel electrodes is in a range of not less than 80 percent and not more than 98 percent of an amplitude of a voltage supplied to the signal lines.

7. (ORIGINAL) A method for driving an image display device, said method applying a voltage between a potential of signal lines and a potential of a common electrode when a potential of scanning lines is ON, and displaying tones by modulating a pulse width of a two-value voltage supplied to the signal lines,

wherein tones are displayed by shifting phases of waveforms of the signal lines and the scanning lines, and polarities of pixels in a signal line direction are inverted alternately.

8. (ORIGINAL) A method for driving an image display device, said method applying a voltage between a potential of signal lines and a potential of a common electrode when a

potential of scanning lines is ON, and displaying tones by modulating a pulse width of a two-value voltage supplied to the signal lines,

wherein tones are displayed by shifting phases of waveforms of the signal lines and the common electrode, and polarities of pixels in a signal line direction are inverted alternately.

9. (ORIGINAL) The method as set forth in claim 8, wherein the waveform of the common electrode is off-phase by a certain degree with respect to the waveform of the scanning lines.

10. (ORIGINAL) The method as set forth in claim 7, wherein a potential difference between the potential of the signal lines and the potential of the common electrode is maximum at an end of one horizontal period.

11. (ORIGINAL) The method as set forth in claim 8, wherein a potential difference between the potential of the signal lines and the potential of the common electrode is maximum at an end of one horizontal period.

12. (ORIGINAL) The method as set forth in claim 7, wherein a potential difference between the potential of the signal lines and the potential of the common electrode is minimum at an end of one horizontal period.

13. (ORIGINAL) The method as set forth in claim 8, wherein a potential difference between the potential of the signal lines and the potential of the common electrode is minimum at an end of one horizontal period.

Claims 14 -15 (CANCELED)

16. (PREVIOUSLY PRESENTED) A method for driving an image display device, said method displaying tones by modulating a pulse width of a two-value voltage supplied to signal lines,

wherein a resistance of a transistor which switches ON or OFF signal application from the signal lines to pixels is increased with time from a beginning to an end of an application time of a single pixel, where the application time of the single pixel is 1 horizontal period.

17. (ORIGINAL) The method as set forth in claim 16 wherein the resistance of the transistor is varied by varying a gate voltage.

18. (CANCELED)

19. (ORIGINAL) A driving device of an image display device which includes a plurality of pixel electrodes which are formed on a substrate, pixel switching elements which are individually connected to the pixel electrodes, a plurality of signal lines for applying a data signal

according to a display image to the pixel electrodes, and a common electrode for applying a common potential to pixels,

said driving device applying a voltage between a potential of the signal lines and a potential of the common electrode when a potential of scanning lines is ON, and displaying tones by modulating a pulse width of a two-value voltage supplied to the signal lines,

wherein said driving device includes a signal line driving section for supplying a signal, which is created by shifting a phase of a voltage waveform whose polarity is inverted per one horizontal period, according to tone data of the display image, with respect to a phase of a voltage waveform of the scanning lines, to the signal lines.

20. (ORIGINAL) A driving device of an image display device which includes a plurality of pixel electrodes which are formed on a substrate, pixel switching elements which are individually connected to the pixel electrodes, a plurality of signal lines for applying a data signal according to a display image to the pixel electrodes, and a common electrode for applying a common potential to pixels,

said driving device applying a voltage between a potential of the signal lines and a potential of the common electrode when a potential of scanning lines is ON, and displaying tones by modulating a pulse width of a two-value voltage supplied to the signal lines,

wherein said driving device includes a signal line driving section for supplying a signal, which is created by shifting a phase of a voltage waveform whose polarity is inverted per one

horizontal period, according to tone data of the display image, with respect to a phase of a voltage waveform of the common electrode, to the signal lines.

21. (PREVIOUSLY PRESENTED) A driving device of an image display device which includes a plurality of pixel electrodes which are formed on a substrate, pixel switching elements which are individually connected to the pixel electrodes, a plurality of signal lines for applying a data signal according to a display image to the pixel electrodes, and a common electrode for applying a common potential to pixels,

said driving device applying a voltage between a potential of the signal lines and a potential of the common electrode when a potential of scanning lines is ON, and displaying tones by modulating a pulse width of a two-value voltage supplied to the signal lines,

wherein said driving device includes a scanning line driving section for varying an amplitude of a voltage supplied to the scanning lines between positive application being application of a voltage to a positive side in voltage application to pixel electrodes with a reference voltage 0V and negative application being application of a voltage to a negative side in voltage application to pixel electrodes with a reference voltage 0V.

22. (ORIGINAL) A driving device of an image display device which includes a plurality of pixel electrodes which are formed on a substrate, pixel switching elements which are individually connected to the pixel electrodes, a plurality of signal lines for applying a data signal

according to a display image to the pixel electrodes, and a common electrode for applying a common potential to pixels,

said driving device applying a voltage between a potential of the signal lines and a potential of the common electrode when a potential of scanning lines is ON, and displaying tones by modulating a pulse width of a two-value voltage supplied to the signal lines,

wherein said driving device includes a scanning line driving section for varying an amplitude of a voltage supplied to the scanning lines so that a resistance of a transistor for switching ON or OFF signal application from the signal lines to the pixels is increased with time from a beginning to an end of an application time of a single pixel.

23. (CANCELED)

24. (ORIGINAL) An image display device which includes a plurality of pixel electrodes which are formed on a substrate, pixel switching elements which are individually connected to the pixel electrodes, a plurality of signal lines for applying a data signal according to a display image to the pixel electrodes, and a common electrode for applying a common potential to pixels,

said image display device applying a voltage between a potential of the signal lines and a potential of the common electrode when a potential of scanning lines is ON, and displaying tones by modulating a pulse width of a two-value voltage supplied to the signal lines,

wherein said image display device includes a signal line driving section for supplying a signal, which is created by shifting a phase of a voltage waveform whose polarity is inverted per

one horizontal period, according to tone data of the display image, with respect to a phase of a voltage waveform of the scanning lines, to the signal lines.

25. (ORIGINAL) An image display device which includes a plurality of pixel electrodes which are formed on a substrate, pixel switching elements which are individually connected to the pixel electrodes, a plurality of signal lines for applying a data signal according to a display image to the pixel electrodes, and a common electrode for applying a common potential to pixels, said image display device applying a voltage between a potential of the signal lines and a potential of the common electrode when a potential of scanning lines is ON, and displaying tones by modulating a pulse width of a two-value voltage supplied to the signal lines, wherein said image display device includes a signal line driving section for supplying a signal, which is created by shifting a phase of a voltage waveform whose polarity is inverted per one horizontal period, according to tone data of the display image, with respect to a phase of a voltage waveform of the common electrode, to the signal lines.

26. (PREVIOUSLY PRESENTED) An image display device which includes a plurality of pixel electrodes which are formed on a substrate, pixel switching elements which are individually connected to the pixel electrodes, a plurality of signal lines for applying a data signal according to a display image to the pixel electrodes, and a common electrode for applying a common potential to pixels,

said image display device applying a voltage between a potential of the signal lines and a potential of the common electrode when a potential of scanning lines is ON, and displaying tones by modulating a pulse width of a two-value voltage supplied to the signal lines,

wherein said image display device includes a scanning line driving section for varying an amplitude of a voltage supplied to the scanning lines between positive application being application of a voltage to a positive side in voltage application to pixel electrodes with a reference voltage 0V and negative application being application of a voltage to a negative side in voltage application to pixel electrodes with a reference voltage 0V.

27. (ORIGINAL) An image display device which includes a plurality of pixel electrodes which are formed on a substrate, pixel switching elements which are individually connected to the pixel electrodes, a plurality of signal lines for applying a data signal according to a display image to the pixel electrodes, and a common electrode for applying a common potential to pixels,

said image display device applying a voltage between a potential of the signal lines and a potential of the common electrode when a potential of scanning lines is ON, and displaying tones by modulating a pulse width of a two-value voltage supplied to the signal lines,

wherein said image display device includes a scanning line driving section for varying an amplitude of a voltage supplied to the scanning lines so that a resistance of a transistor for switching ON or OFF signal application from the signal lines to the pixels is increased with time from a beginning to an end of an application time of a single pixel.

28. (CURRENTLY AMENDED) An activematrix-driven image display device including an image display panel for displaying an image by switching by a plurality of active elements, comprising:

a voltage varying circuit for varying a voltage of a signal for driving the active elements according to temperature change of the image display panel, so as to carry out temperature compensation of the active elements, and

a step-up circuit for stepping up a signal voltage for driving the active elements,

said signal voltage for driving the active elements being stepped up by the step-up circuit after being varied by the voltage varying circuit, and

wherein said image display panel carries out tone display by phase modulation driving.

29. (ORIGINAL) The image display device as set forth in claim 28, wherein said image display panel is a liquid crystal display panel.

30. (ORIGINAL) The image display device as set forth in claim 28, comprising a temperature detector for detecting temperature change of the image display panel.

31. (CANCELED)

32. (ORIGINAL) The image display device as set forth in claim 28, wherein an applied voltage of a scanning signal is varied according to temperature change of the image display panel.

33. (ORIGINAL) The image display device as set forth in claim 28, wherein an applied voltage of a common signal is varied according to temperature change of the image display panel.

34. (ORIGINAL) The image display device as set forth in claim 28, wherein an applied voltage of a tone signal is varied according to temperature change of the image display panel.

35. (CANCELED)

36. (PREVIOUSLY PRESENTED) A driving device of an activematrix-driven image display device having an image display panel for displaying an image by switching by a plurality of active elements, said driving device comprising:

a voltage varying circuit for varying a voltage of a signal for driving the active elements according to temperature change of the image display panel, so as to carry out temperature compensation of the active elements, and

a step-up circuit for stepping up a signal voltage for driving the active elements,

said signal voltage for driving the active elements being stepped up by the step-up circuit after being varied by the voltage varying circuit.

37. (PREVIOUSLY PRESENTED) A driving method of an activematrix-driven image display device having an image display panel for displaying an image by switching by a plurality of active elements and carrying out step up voltage of a signal for driving the active elements so as to supply the signal to the image display panel,

wherein a voltage of a signal for driving the active elements is varied before the step up according to temperature change of the image display panel, so as to carry out temperature compensation of the active elements.

38. (PREVIOUSLY PRESENTED) The method as set forth in claim 7, wherein:
a phase of the common electrode is constant with respect to a scanning signal, and
tones are displayed by shifting phases of waveforms of the signal lines and the scanning lines so that the potential of the signal lines is switched between high level and low level after an elapsed time period which varies depending on the tone when the potential of the scanning lines is ON.

39. (PREVIOUSLY PRESENTED) The method as set forth in claim 9, wherein tones are displayed by shifting phases of waveforms of the signal lines and the common electrode so

that the potential of the signal lines is switched between high level and low level after an elapsed time period which varies depending on the tone when the potential of the scanning lines is ON.

40. (PREVIOUSLY PRESENTED) The driving device as set forth in claim 19 wherein:
a phase of a waveform of the common electrode has a constant phase difference with respect to a phase of a waveform of the scanning line, and
the signal line driving section supplies a signal, which is created by shifting a phase of a voltage waveform whose polarity is inverted per one horizontal period so that the potential of the signal lines is switched between high level and low level after an elapsed time period which varies depending on the tone when the potential of the scanning lines is ON, with respect to a phase of a voltage waveform of the scanning lines, to the signal lines.

41. (PREVIOUSLY PRESENTED) The image display device as set forth in claim 24, wherein:

a phase of a waveform of the common electrode has a constant phase difference with respect to a phase of a waveform of the scanning line, and
the signal line driving section supplies a signal, which is created by shifting a phase of a voltage waveform whose polarity is inverted per one horizontal period so that the potential of the signal lines is switched between high level and low level after an elapsed time period which varies depending on the tone when the potential of the scanning lines is ON, with respect to a phase of a voltage waveform of the scanning lines, to the signal lines.

42. (PREVIOUSLY PRESENTED) The driving device as set forth in claim 20, wherein:
a phase of a waveform of the common electrode has a constant phase difference with respect to a phase of a waveform of the scanning line, and
the signal line driving section supplies a signal, which is created by shifting a phase of a voltage waveform whose polarity is inverted per one horizontal period so that the potential of the signal lines is switched between high level and low level after an elapsed time period which varies depending on the tone when the potential of the scanning lines is ON, with respect to a phase of a voltage waveform of the common electrode, to the signal lines.

43. (PREVIOUSLY PRESENTED) The image display device as set forth in claim 25, wherein:

a phase of a waveform of the common electrode has a constant phase difference with respect to a phase of a waveform of the scanning line, and
the signal line driving section supplies a signal, which is created by shifting a phase of a voltage waveform whose polarity is inverted per one horizontal period so that the potential of the signal lines is switched between high level and low level after an elapsed time period which varies depending on the tone when the potential of the scanning lines is ON, with respect to a phase of a voltage waveform of the common electrode, to the signal lines.

44. (CURRENTLY AMENDED) ~~The image display device as set forth in claim 26,~~
~~wherein: The driving device as set forth in claim 21, wherein:~~

a polarity of a voltage supplied to the scanning line is inverted per one vertical period,
and

the scanning line driving section varies an amplitude of a voltage supplied to the scanning
lines between adjacent vertical periods.

45. (PREVIOUSLY PRESENTED) The image display device as set forth in claim 26,
wherein:

a polarity of a voltage supplied to the scanning line is inverted per one vertical period,
and

the scanning line driving section varies an amplitude of a voltage supplied to the scanning
lines between adjacent vertical periods.

46. (PREVIOUSLY PRESENTED) The driving device as set forth in claim 21, wherein:
the scanning line driving section varies an amplitude of a voltage supplied to the scanning
lines so that a voltage of the scanning lines upon negative application is lower than a voltage of
the scanning lines upon positive application.

47. (PREVIOUSLY PRESENTED) The image display device as set forth in claim 26, wherein:

the scanning line driving section varies an amplitude of a voltage supplied to the scanning lines so that a voltage of the scanning lines upon negative application is lower than a voltage of the scanning lines upon positive application.

48. (PREVIOUSLY PRESENTED) The driving device as set forth in claim 22, wherein:
the scanning line driving section supplies a voltage to the scanning lines so as to be large in the beginning of one horizontal period and decrease toward the end of this period, so that a resistance of the transistor as the pixel switching element for switching ON or OFF signal application from the signal lines to the pixel increases with time from the beginning to the end of the application time on a single pixel.

49. (PREVIOUSLY PRESENTED) The image display device as set forth in claim 27, wherein:
the scanning line driving section supplies a voltage to the scanning lines so as to be large in the beginning of one horizontal period and decrease toward the end of this period, so that a resistance of the transistor as the pixel switching element for switching ON or OFF signal application from the signal lines to the pixel increases with time from the beginning to the end of the application time on a single pixel.

50. (PREVIOUSLY PRESENTED) The driving device as set forth in claim 22, wherein:
the scanning line driving section varies an amplitude of a voltage supplied to the scanning lines so that a resistance of the transistor as the pixel switching element for switching ON or OFF signal application from the signal lines to the pixel increases with time from the beginning to the end of the application time on a single pixel, and so that a voltage of the scanning lines upon negative application is lower than a voltage of the scanning lines upon positive application.

51. (PREVIOUSLY PRESENTED) The image display device as set forth in claim 27,
wherein:
the scanning line driving section varies an amplitude of a voltage supplied to the scanning lines so that a resistance of the transistor as the pixel switching element for switching ON or OFF signal application from the signal lines to the pixel increases with time from the beginning to the end of the application time on a single pixel, and so that a voltage of the scanning lines upon negative application is lower than a voltage of the scanning lines upon positive application.

52. (PREVIOUSLY PRESENTED) The method as set forth in claim 16, the method
including supplying a voltage to the scanning lines so as to be large in the beginning of 1H period and decrease toward the end of this period, so that a resistance of the transistor as the pixel switching element for switching ON or OFF signal application from the signal lines to the pixel increases with time from the beginning to the end of the application time on a single pixel.

53. (PREVIOUSLY PRESENTED) The method as set forth in claim 16, the method including supplying a voltage to the scanning lines so that a resistance of the transistor as the pixel switching element for switching ON or OFF signal application from the signal lines to the pixel increases with time from the beginning to the end of the application time on a single pixel, and so that a voltage of the scanning lines upon negative application is lower than a voltage of the scanning lines upon positive application.

54. (PREVIOUSLY PRESENTED) The image display device as set forth in claim 32, wherein:

the voltage varying circuit decreases the applied voltage of the scanning signal with increase in temperature so that a constant current flow is supplied to a drain electrode of the active element.

55. (PREVIOUSLY PRESENTED) The image display device as set forth in claim 33, wherein:

the voltage varying circuit decreases a common signal voltage applied to a counter electrode by the amount of a decreased potential of the drain electrode, according to temperature change of the image display panel, so as to hold a drain current flow into the active element constant.

56. (PREVIOUSLY PRESENTED) The image display device as set forth in claim 34, wherein:

the voltage varying circuit increases a tone signal voltage applied to a drain electrode by the amount of a decreased potential of the drain electrode, according to temperature change of the image display panel, so as to hold a drain current flow into the active element constant.

57. (PREVIOUSLY PRESENTED) The method as set forth in claim 37, wherein:

temperature compensation of the active elements is carried out in such a manner that an applied voltage of the scanning signal is decreased with increase in temperature so that a constant current flow is supplied to a drain electrode of the active element.

58. (PREVIOUSLY PRESENTED) The method as set forth in claim 37, wherein:

temperature compensation of the active elements is carried out in such a manner that a common signal voltage applied to a counter electrode is decreased by the amount of a decreased potential of the drain electrode, according to temperature change of the image display panel, so as to hold a drain current flow into the active element constant.

59. (PREVIOUSLY PRESENTED) The method as set forth in claim 37, wherein:

temperature compensation of the active elements is carried out in such a manner that a tone signal voltage applied to a drain electrode is increased by the amount of a decreased

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potential of the drain electrode, according to temperature change of the image display panel, so as to hold a drain current flow into the active element constant.